

IN THE CLAIMS:

Please cancel claims 1-12 without prejudice or disclaimer to the subject matter therein.

Please add new claims 13-18 as follows.

13. A signal transmission apparatus for transmitting a first data stream and a second data stream, comprising:

- a modulator operable to assign each of the first data stream and the second data stream to a respective constellation in a vector space diagram to produce modulated signals wherein the number of signal points of the constellation for the first data stream is different from the number of signal points of the constellation for the second data stream;

- an inverse Fast Fourier Transformer (IFFT) operable to convert the modulated signals into an IFFT converted signal, having an effective symbol part and a guard interval, according to Orthogonal Frequency Division Multiplexing; and

- a transmitter operable to transmit the IFFT converted signal;

wherein the first data stream has an interval data for representing the guard interval.

14. A signal receiving apparatus comprising:

- a Fast Fourier Transformer (FFT) operable to convert a received signal, having an effective symbol part and a guard interval, into a FFT converted signal according to Orthogonal Frequency Division Multiplexing;

the received signal having information of a first data stream and a second data stream, wherein the first data stream and the second data stream are each assigned to a respective constellation in a vector space diagram, the number of signal points of the constellation for the first data stream is different from the number of signal points of the constellation for the second data stream;

the first data stream having an interval data for representing the guard interval; and

- a demodulator operable to demodulate the FFT converted signal to produce the first data stream and the second data stream, wherein the second data stream is produced according to the interval data.

15. A signal transmission system for transmitting and receiving a first data stream and a second data stream, said signal transmission system comprising a signal transmission apparatus and a signal receiving apparatus,

said signal transmission apparatus, comprising:

- a modulator operable to assign each of the first data stream and the second data stream to a respective constellation in a vector space diagram to produce modulated signals wherein the number of signal points of the constellation for the first data stream is different from the number of signal points of the constellation for the second data stream, and the first data stream has an interval data for representing a guard interval;

- an inverse Fast Fourier Transformer (IFFT) operable to convert the modulated signals into an IFFT converted signal, having an effective symbol part and the guard interval, according to Orthogonal Frequency Division Multiplexing; and

- a transmitter operable to transmit the IFFT converted signal;

said signal receiving apparatus comprising:

- a Fast Fourier Transformer (FFT) operable to convert a received signal, having the effective symbol part and the guard interval, into a FFT converted signal according to Orthogonal Frequency Division Multiplexing; and

- a demodulator operable to demodulate the FFT converted signal to produce the first data stream and the second data stream, wherein the second data stream is produced according to the interval data.

16. A signal transmission method for transmitting a first data stream and a second data stream, comprising:

- assigning each of the first data stream and second data stream to a respective constellation in a vector space diagram to produce modulated signals wherein the number of signal points of the constellation for the first data stream is different from the number of signal points of the constellation for the second data stream;

- converting the modulated signals into an IFFT converted signal having an effective symbol part and a guard interval, according to Orthogonal Frequency Division Multiplexing; and
- transmitting the IFFT converted signal;
wherein the first data stream has an interval data for representing the guard interval.

17. A signal receiving method comprising:

- converting a received signal, having an effective symbol part and a guard interval, into a FFT converted signal according to Orthogonal Frequency Division Multiplexing, the received signal having information of a first data stream and a second data stream, wherein each of the first data stream and second data stream is assigned to a respective constellation in a vector space diagram, and the number of signal points of the constellation for the first data stream is different from the number of signal points of the constellation for the second data stream;
the first data stream having an interval data for representing the guard interval; and
- demodulating the FFT converted signal to produce the first data stream and the second data stream, wherein the second data stream is produced according to the interval data.

18. A signal transmission and receiving method for transmitting and receiving a first data stream and a second data stream, said signal transmission and receiving method comprising a signal transmission method and a signal receiving method,

said signal transmission method, comprising:

- assigning each of the first data stream and the second data stream to a respective constellation in a vector space diagram to produce modulated signals wherein the number of signal points of the constellation for the first data stream is different from the number of signal points of the constellation for the second data stream, and the first data stream has an interval data for representing a guard interval;
- converting the modulated signals into an IFFT converted signal, having an effective symbol part and the guard interval, according to Orthogonal Frequency Division Multiplexing; and
- transmitting the IFFT converted signal;

said signal receiving method comprising:

- converting a received signal, having the effective symbol part and the guard interval, into a FFT converted signal according to Orthogonal Frequency Division Multiplexing; and
- demodulating the FFT converted signal to produce the first data stream and the second data stream, wherein the second data stream is produced according to the interval data.